

Date: 11th September 2023

The Rt Hon Claire Coutinho MP PC
Secretary of State for Energy Security and Net Zero
1 Victoria Street
London
SW1H 0ET By email: via Planning Inspectorate

Dear Ms Coutinho

Re: Sunnica Energy Farm, Planning Inspectorate reference EN010106
(1) Secretary of State's Request for Information letter 27 July 2023
(2) Reply by Pinsent Masons LLP for the Applicant 10 August 2023
(3) Email invitations to comment, 14 August, 23 August and 1 September 2023

Para. 4 Battery Energy Storage System (BESS) Design & Hazardous Substance Consent (HSC)

Thank you for inviting Interested Parties to comment on replies.

Information Request para. 4: BESS Design and HSC

This asked the Applicant to specify, in effect, "whether or not" the proposed BESS will require HSC, under the Planning (Hazardous Substances) Regulations 2015.

The question is highly pertinent, because it determines the correct procedure and consultations, required by Policy and law, for the Application to be lawfully consented.

Reply by Pinsent Masons LLP (Section 2 of letter 10 August)

It is notable that the Applicant refuses to answer, insisting "we cannot tell at this stage". There is no provision for this "indeterminate" status. Proper conduct of the Examination requires that the question be resolved, one way or the other. The claim that detailed design is required I reject as fundamentally wrong. I show in Section 8 of the enclosed that it is straightforward to determine the need for HSC and the closely related COMAH obligations, on multiple criteria.

Commentary on Replies

A detailed Commentary is attached. Appendix A indexes contributions already made.

My position as Interested Party (UID 20030698)

This Application cannot be lawfully consented. It is void of the consultations required by Policy and by law, within the consenting process, for industrial plant presenting a Major Accident Hazard. Notice of a Major Accident Hazard, as defined in law, was given to the Examining Authority, and my extensive submissions document the multiple ways in which the various thresholds for HSC, or the parallel obligations under the Control Of Major Accident Hazards Regulations (COMAH), are obviously exceeded.

The Sunnica BESS proposal is of unprecedented size. Throughout the Examination period, the disclosed storage capacity of 2400 MWh would have made them the largest BESS in the world, involving some 15,000 tonnes of functional chemicals. It is not credible that *none* of the prescribed thresholds would be exceeded.

It should be noted that it is not COMAH “notification”, *per se*, that is at issue. It is the Policy, legal and procedural requirements that such *future* obligations impose *at the consenting stage*, that render the Application defective.

Li-ion BESS as COMAH establishments

At one stage the Applicant relied on a Parliamentary Written Answer UIN 29036 giving views from the Health and Safety Executive (HSE) on the scope of the COMAH Regulations 2015, in effect asserting an exemption for Li-ion BESS. I am fully familiar with this position from direct correspondence, some *via* my MP, the Rt Hon Mrs Lucy Frazer KC MP.

Having taken independent legal opinion, I am confirmed in my conviction that the HSE position stated in UIN 29036 is fundamentally wrong as a matter of law, and in asserting an exemption for Li-ion BESS which is not found in the law as enacted, *ultra vires*. It is irreconcilably divergent from the approach of the Health and Safety Executive for Northern Ireland, administering materially identical Regulations. Not more than one of two contradictory positions can be legally correct, and I am confident that the HSE position in Great Britain would fail, if tested in the Courts.

Submissions of mine (REP4-089 & REP4-092) analysed this position in detail. I do not believe that the HSE position can safely be relied upon in your decision. Even the Applicant no longer relies on it.

Your duties under R. 24 Planning (Hazardous Substances) Regulations 2015

Since 2015, the Secretary of State has had a duty to ensure that any “designated” National Policy Statement takes into account (a) prevention and mitigation of major accidents, and (b) the “Article 13(2) matters” (concerning “appropriate safety distances” between major plant and other development, and protection of sites of natural sensitivity).

The current NPS EN-1 dates from 2011, pre-dating the 2015 Regulations. Whilst it is arguably compliant with the first objective through requirements under “Safety”, the “Article 13(2) matters” do not appear in those terms. They are however already explicit for *local* Planning policies¹. It would be intolerable if NSIP proposals such as EN010106 were subject to a *lesser* degree of scrutiny than applicable in *local* decisions, such as a smaller project not meeting the 50 MW threshold, or a “BESS-only” project with identical hazards to EN010106.

Resolutions are discussed in Section 5 enclosed.

The Applicant’s central confusion regarding HSC obligations

The Applicant’s leading confusion is their assertion that whether or not HSC is required (and the related question of COMAH obligations) cannot be determined without a finalised design. I reject this contention as fundamentally wrong. A finalised design is certainly required for a detailed “full consequence model” of BESS accident scenarios, but that is a completely different matter from deciding if *any one* quantity threshold in the Regulations is “reasonable to foresee” being exceeded. The Applicant confuses two quite different things.

HSC and COMAH obligations are determined solely by whether aggregate *quantities* of specified hazardous substances exceed specified thresholds, and nothing more. Breach of a *single* threshold suffices, as shown for four criteria in Section 8 of the enclosed. Detailed design is wholly unnecessary to reach this conclusion.

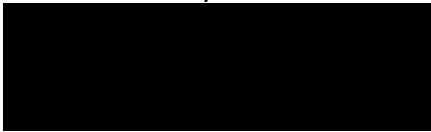
¹ R.10 of the Town and Country Planning (Local Planning) (England) Regulations 2012

To *escape* HSC/COMAH obligations on the other hand requires that *all* reasonably foreseeable hazardous substances are “below threshold” in all reasonably foreseeable “loss of control” situations, and that *all* hazardous functional chemicals (including “provisional assignments” under Part 4 Note 6) are similarly “below threshold”.

For a proposal of such unprecedented size, this is most improbable.

I trust that the enclosed Commentary will assist in arriving at a lawful decision in EN010106, in particular considering the Major Accident Hazards presented by grid-scale Li-ion BESS of unprecedented scale.

Yours sincerely



Edmund Fordham MA PhD(Cantab) CPhys CEng FInstP Eurlng

Enc: Invited Commentary on Replies to Information Request by the SoS

cc: The Rt Hon Mrs Lucy Frazer KC MP (South-East Cambridgeshire)
The Prime Minister, the Rt Hon Rishi Sunak MP

Comments on Applicant replies to Information Request from the Secretary of State:
Dr Edmund Fordham IP 20030698

Dated: 11th September 2023

THE PLANNING INSPECTORATE

EN010106 – Sunnica Energy Farm

**APPLICATION BY SUNNICA Ltd for an Order Granting Development Consent
for the Sunnica Energy Farm Project pursuant to The Planning Act 2008**

**To the Secretary of State for Energy Security and Net Zero:
The Rt Hon Claire Coutinho PC MP**

Comments on Applicant replies to Secretary of State's 27 July letter

**Eurling Dr Edmund John Fordham MA PhD CPhys CEng FInstP
Interested Party – Unique Reference: 20030698**

Context:

1. A "Request for Information" dated 27 July 2023 was issued by the Secretary of State for Energy & Net Zero (Mr John Wheadon, Head of Energy Infrastructure Planning Delivery, during the tenure of the Secretary of State's predecessor in office) requesting further information, from the Applicant, *inter alia*, on "BESS design and Hazardous Substances Consent" (paragraph 4 of the letter).
2. A letter from myself dated 2 August 2023 requested clarification of two references to the "Health and Safety Regulations" (*sic*). My letter was not published.
3. A response from Pinsent Masons LLP for the Applicant, dated 10 August 2023, was published on the Planning Inspectorate website 11 August 2023.
4. By email of 14 August 2023 the Secretary of State invited Interested Parties to comment on the information provided in response to the information request of 27 July. The email (and subsequent ones repeating the invitation) confirmed, as anticipated, that references to the "Health and Safety Regulations" should have read "the Planning (Hazardous Substances) Regulations 2015".
5. The invitation to comment was repeated on 23 August and 1 September 2023.

The following commentary is in response to the replies made by the Applicant dated 10 August 2023 responding to the Secretary of State's "Request for Information" dated 27 July 2023.

Conventions for colour highlighting:

Quotations from legislation are shown in blue

Quotations from policy documents, or competent authorities, are shown in magenta

Quotations from Applicant are shown in ochre

Quotations from Government statements are shown in green

The question put by the Secretary of State:

4. ... **The Applicant** should provide an update on its position on the BESS design and whether or not it will fall under one of the three categories in Schedule 1 of the Health and Safety Regulations.

Subsequent clarifications confirm that the Planning (Hazardous Substances) Regulations 2015 (P(HS)Regs 2015) are meant. In effect, the question asks the Applicant to say “whether or not” HSC is required for the BESS.

Commentary: The Applicant has simply not answered the question.

It persists in the “we don’t know” position developed during the Examination. There is no provision in either Policy or law for this “indeterminate” status. Proper conduct of the Examination and Decision process requires the issue to be determined, one way or the other.

Although HSC may, exceptionally, be deferred (subject to conditions), the closely related question of COMAH regulation and the Policy requirement¹ for a safety appraisal by the COMAH Competent Authority (CA) may not be, and a report on consultation with the COMAH CA is required by law² at the time of Application.

The claim that a detailed design is required to determine the issue is rejected as fundamentally wrong. As shown in item 8 below, this decision is technically straightforward, even without a finalised design. Sunnica appears to confuse the issue with what it calls a “full consequence model” of accident scenarios, which would indeed require detailed design, but the regulatory decision does not³.

HSC/COMAH obligations are determined solely by whether aggregate *quantities* of Hazardous Substances present (including contingent presence in “loss of control”) exceed specified thresholds, and nothing more.

Breach of a *single* threshold suffices, as shown for *four* criteria in item 8 below. Detailed design is quite unnecessary to reach this conclusion.

To *escape* HSC/COMAH obligations requires that *all* reasonably foreseeable hazardous substances are “below threshold” in *all* reasonably foreseeable “loss of control” situations, and that *all* hazardous chemical components (including “provisional assignments” under Part 4 Note 6) are similarly “below threshold”. Given the sheer scale of the Sunnica proposal – projected⁴ to be the largest BESS in the world⁵ – it is most improbable that this could be done.

Further analysis is provided in item 8 of the additional commentary, under appropriate headings (see Table of Contents). The conclusion in Section 8.4 is clear: the Sunnica BESS require HSC and are subject to “upper-tier” COMAH obligations, on multiple grounds.

¹ Under the “Safety” section 4.11.4 National Policy Statement EN-1

² By R.26(2)(b,c,d) P(HS)Regs 2015

³ As in my WR REP2-129, developed further throughout the Examination

⁴ Throughout the Examination period.

⁵ The Moss Landing, California, facility was the largest, at 1600 MWh; it has since been upgraded to 3000 MWh but the 2400 MWh proposed for Sunnica still approaches this figure and could over time reach it, if subsequently upgraded. No upper limit was agreed by the Applicant.

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1. DCOs for other projects:

The Applicant (Section 2.6 of the Pinsent Masons letter) cites DCOs consented for Longfield Solar Farm and Cleve Hill Solar Park *without* HSC being sought “**either through the DCO or in parallel with it**”.

Commentary: These projects are wholly irrelevant to Sunnica.

EN010106 must be determined on its merits, according to law, and on the evidence presented. DCOs consented elsewhere are not judicial decisions in the Courts, cannot determine interpretation of the law, and in no sense constitute legal precedent. They cannot, therefore, be used in support.

From multiple enquiries I am now receiving from across the UK, I am increasingly convinced that many projects involving BESS are being consented not only in ignorance of the hazards of grid-scale Li-ion BESS, but in disregard of the law.

I believe it is only a matter of time before one of these cases reaches the Courts, in judicial challenges to decisions, or enforcement actions under the Planning (Hazardous Substances) Act 1990.

2. Dialogue on HSC:

The Applicant's 2.1 claims that "some submissions became repetitive" and says it "made the decision that it was not proportionate to keep responding".

Commentary: The Applicant acknowledges a decision to stop responding on the ground that submissions were "repetitive". I am not named explicitly but the only repetitions in my submissions were when no meaningful response was made, or where basic matters of what is required by Policy or law were not conceded. On the contrary, the case I have presented was developed carefully, on technical and on legal grounds⁶.

It is more likely that the Applicant was unwilling or unable to engage with my submissions on the technical level, but nevertheless recognised that any concession on HSC would be fatal to its case.

This is because HSC obligations would also imply an "establishment"⁷ subject to the COMAH Regulations 2015. That would then require the parallel safety assessments from the COMAH Competent Authority (CA) required by Policy⁸, and law⁹, at the Planning stage, which do not exist. Unlike HSC, there is no provision for their deferral. This exposes the Application as defective.

This is one point that I *have* repeated several times, though obviously it could not serve the Applicant's purpose to concede it.

It should be noted that there has been no consultation with the COMAH Competent Authority (HSE plus the Environment Agency "acting jointly"¹⁰), clearly acting as such, at any point.

⁶ Beginning with my paper co-authored with Professor Sir David Melville CBE Annex EF16 REP2-129e and my Written Representation REP2-129. This was extended with the "provisional assignments" required by Part 4 Note 6 P(HS)Regs 2015, with further material on Inhalable Nickel Oxides and the demonstration of a Major Accident Hazard as defined in law, in Comments at D6, D7 and D8 REP6-084, REP7-09 and REP8-045. My Comments at D10 REP10-064 summarised the issues.

⁷ As defined in R. 2(1) COMAH Regs 2015

⁸ From the COMAH Competent Authority (CA), under the "Safety" section 4.11.4 National Policy Statement EN-1, for proposals likely to be subject to the COMAH Regulations 2015 at the construction and operational stages.

⁹ Consultation with the COMAH CA is required under R.26(2)(b) P(HS)Regs 2015, for the report to be available to the public at the time of application R.26(2)(c), and for public comment *before* any decision, under R.26(2)(d).

¹⁰ As defined in R.2(1) P(HS)Regs 2015 and R.4(b) COMAH Regs 2015

3. Involvement of HSE

The Applicant's 2.5 claims that HSE "were consulted on the DCO Application".

Commentary: This is not true to any substantive degree. HSE involvement was confined to (a) the advice (to the Applicant) at EIA and S.42 stages, and (b) their letter¹¹ in response to Questions from the ExA¹². Moreover the advice actually given by HSE¹³ "Further information on HSC should be sought from the relevant Hazardous Substances Authority" was dismissed¹⁴ as "not ... relevant to this project as no hazardous materials are expected".

The only consultations with HSE, yielding "Scoping Opinions", were made at the EIA and S.42 stages¹⁵ (pre-Application) when the scale of the proposed BESS remained undisclosed, in spite of repeated requests for details¹⁶.

The unprecedented¹⁷ capacity of 2400 MWh (corresponding to a total mass of functional chemicals of around 15,000 tonnes¹⁸) was disclosed only on 1 November 2022¹⁹ at ISH1, after the Examination had opened.

The energy storage capacity in megawatt-hours (MWh) is the most basic possible design parameter of *any* energy storage system. In the case of batteries this determines the total mass of functional chemicals in the cells. This will be in direct proportion to the energy storage capacity. Without a specification of energy storage capacity, the size and scale of proposal remains wholly unspecified and undetermined.

Power ratings in megawatts (MW) do *not* specify energy storage. They specify only the *rate* at which energy can be stored or delivered. They determine the size of cables, inverters and switchgear but *not* the size of the BESS. Hence the BESS remained completely unspecified, at the only stages at which HSE was consulted.

HSE also says²⁰ advice was given at the S.56 stage (i.e. acceptance of Application) but a subsequent FOIA enquiry reveals that "HSE does not hold any advice given for Section 56" (**Appendix B** hereto, text highlighted).

¹¹ HSE's REP7-112 dated 1 March 2023

¹² The HSE's REP9-008 cited merely adds a Note to the dDCO amendments confirming their recusal from the Battery Fire Safety Management Plan (Requirement 7) already made in their REP7-112.

¹³ In Annex EF54 REP8-045a and elsewhere in the Library

¹⁴ APP-048 page 16-24

¹⁵ Abstracted in Annex EF54 REP8-045a and present elsewhere in the Library.

¹⁶ See e.g. the exchange of letters in Annex EF57 REP8-045d

¹⁷ The largest BESS in the world is at Moss Landing, California, sited in a remote location, with a capacity of 1600 MWh until June 2023 when upgrades to 3000 MWh became operational. Throughout the Examination, the Sunnica proposal remained unprecedented regarding the scale of the BESS, and remains unprecedented regarding proximity to habitation and sites of natural sensitivity.

¹⁸ This estimate is based on site planning guidance from the Energy Institute (Annex EF10, REP2-082k) and supported by the composition of an actual BESS abstracted in Annex EF16 REP2-129e and the source in Annex EF22 REP2-129j. The estimate was first set out in my Comments at D6, para. 25, REP6-060.

¹⁹ Documented in my Post-Hearing Submission (PHS) after the Issue-Specific Hearing (ISH1) on the draft DCO, REP2-082a.

²⁰ Letter 1 March REP7-112, final para. under Q3.1.5. and 3.1.6

The HSE letter contains further inconsistencies, declaring that HSE does not provide advice on Battery Fire Safety Management Plans (BFSMP), a matter of weeks after it in fact did so²¹, indeed offering follow-up comment therein.

The Application materials themselves continued to withhold declaration of an energy storage capacity until oral disclosure at ISH1. Even if HSE had in fact issued advice at the S.56 stage, nothing further would have been possible.

Hence HSE was *never* “consulted on the DCO Application” at any stage at which the unprecedented scale of the proposal was declared to them²². It is quite unreasonable to claim that the consultations which did take place represent compliance with legal and Policy requirements.

Overall the involvement of HSE within the Examination has been minimal, in spite of my appeal²³ to the Examining Authority (ExA) for HSE’s active engagement.

4. Claim of support from HSE for the Applicant’s position on HSC

Support is claimed from the HSE²⁴ that replies to ExQ 3.1.10 “appears to concur with Sunnica’s position that the necessity for hazardous substances consent will not be known until detailed design stage.”

Commentary: This claim of support is empty. There is nothing whatsoever in HSE’s text that supports this. The answer to ExQ 3.1.10 reads:

“Many areas of Health and Safety law do not require consents depending on the detail of the design and operation and therefore consents may not be required. HSE would expect compliance with all aspects of Health and Safety legislation at the stage it becomes applicable.”

To claim that this supports the Applicant’s contention that “it is too early to tell” (regarding HSC) really is a stretch too far.

²¹ As documented in my D8 Comments REP8-045 para. 7, citing the advice letter from HSE included in Appendix B of the Applicant’s own REP7-056.

²² The HSE letter REP7-112 responds to specific Questions from the ExA but there is no record of them being formally advised of the scale of the proposed BESS or asked to determine their status

²³ At Open Floor Hearing OFH2, text in Annex EF43 REP4-084, and in my REP4-083.

²⁴ Their 2.5; responses to ExQ 3.1.10 contained in HSE’s REP7-112 of 1 March 2023

5. Relevant stages for consideration of Major Accident Hazards.

The Applicant's 2.3 states that: "The Examining Authority, and ultimately the Secretary of State, should be satisfied that the relevant legislative provisions would operate properly at the relevant time";

Commentary: This appeals to the principle that decisions should ordinarily assume that "schemes of protection", will operate as intended²⁵.

However Major Accident Prevention and Mitigation is exceptional, as confirmed in in Advice Note 11 (Annex G on the HSE) on the Planning Inspectorate website²⁶, explicitly referenced in the EIA stage advice issued to the Applicant²⁷ by HSE. This is clear that "if the Proposed Development is *not* within scope of the COMAH Regulations", safety concerns may be discharged by Requirements. However:

If the Proposed Development will be in scope of the COMAH Regulations, a risk assessment would need to include relevant information on the extent and severity of hazards from the Proposed Development, with the potential to impact on local populations, and/ or the adjacent major hazard installations.

Hence as noted under Item 2 above, if the proposed BESS comprise a COMAH "establishment", further obligations arise at the Planning stage, specifically a Risk Assessment, scrutinised by HSE or the COMAH CA²⁸.

Thus, since the "Seveso III Directive" (Seveso)²⁹, "the relevant time" is during the Examination and at the point of decision, as required by Article 13(3) of Seveso:

... The procedures shall be designed to ensure that operators provide sufficient information on the risks arising from the establishment and that technical advice on those risks is available, either on a case-by-case or on a generic basis, when decisions are taken.

Notwithstanding EU Exit, the various "transpositions" of Article 13(3) into UK law remain fully in force and it provides a "plain language" statement of the legislative intentions, remaining enacted, *inter alia*, in R.26 P(HS)Regs 2015³⁰.

The Applicant, in failing to disclose either size (until ISH1) or chemistry of the BESS, has failed completely to provide "sufficient information on the risks" and now seeks to say that these risks cannot be known without detailed design, which will not take place until after "decisions are taken".

This would be in clear conflict with:

- (i) Article 13(3) of Seveso;
- (ii) R.26(2)(b,c,d) P(HS)Regs 2015;
- (iii) Section 4.11.4 NPS EN-1;
- (iv) Advice Note 11 Annex G.

²⁵ E.g. in the National Planning Policy Framework, DLUHC, July 2021

²⁶ <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-eleven-annex-g/>

²⁷ In Annex EF54 REP8-045a

²⁸ Thus complying with the Policy requirements in Section 4.11.4 National Policy Statement EN-1, and legal requirements in R.26(2)(b,c,d) P(HS)Regs 2015.

²⁹ Directive 2012/18/EU available in Annex EF4 REP2-082e

³⁰ Specifically Rs. 5, 9, 10, 26 and 32 P(HS)Regs 2015. Full Table of Transposition in REP2-082g

Moreover, the Secretary of State has a duty³¹ to consider “the objectives of preventing major accidents and limiting the consequences of such accidents for human health and the environment” in formulating any designated National Policy Statement (NPS). This has been explicit for *local* Planning policies³² since 2012.

The current NPS EN-1 (July 2011) predates Seveso and the P(HS)Regs 2015, but is arguably compliant with the Secretary of State’s duty, through the Policy requirement³³ for a Safety Assessment by the COMAH CA.

Specifically, at the point of decision, the Secretary of State is required to “be satisfied that ... the [COMAH] Competent Authority has assessed that it [the proposed design] meets the safety objectives ...” – these being that: “the inherent features of the design are sufficient to prevent, control and mitigate major accidents.”

This Policy provision is clear. It is clearly impossible for the Secretary of State to “be satisfied” on a non-existent safety assessment, emphasising the point (item 2 above) that concessions on HSC by the Applicant would be fatal to its case.

The Secretary of State also has a duty³⁴ to ensure that designated NPSs specifically consider the “Article 13(2) matters”, explicit for local Planning policies³⁵:

- (c) the need, in the long term—
 - (i) to maintain appropriate safety distances between establishments and residential areas, buildings and areas of public use, recreational areas, and, as far as possible, major transport routes;
 - (ii) to protect areas of particular natural sensitivity or interest in the vicinity of establishments, where appropriate through appropriate safety distances or other relevant measures;

The current NPS EN-1, pre-dating Seveso, does not contain explicit requirements for “appropriate safety distances” from other development or areas of natural sensitivity, in these terms. Hence the Secretary of State would appear to be in default of her duty to include them in NPSs, unless the decision in EN010106 reflects these considerations. Smaller proposals than Sunnica not meeting the 50 MW threshold, or a “BESS-only” proposal otherwise identical to the Sunnica BESS, would be decided as *local* Planning applications, wherein the “Article 13(2) matters” would be explicit considerations, by Policy, at the consenting stage.

It would be intolerable if Sunnica (or any NSIP) were able to evade scrutiny of matters which for *local* Planning applications would be explicit.

This emphasises that a risk or hazard assessment sufficient to determine “appropriate safety distances” on a rational engineering basis, should be considered an obligatory component *within* the Examination process and at the point of Decision. No such hazard assessment has been provided: indeed it was refused³⁶.

³¹ Under R.24(1)(a) P(HS)Regs 2015

³² In R.10(1)(b) Town and Country Planning (Local Planning) (England) Regulations 2012, (TCP(LP)(E)Regs 2012) “Local Plans and supplementary Planning documents: additional matters to which regard is to be had”

³³ In Section 4.11.1 NPS EN-1

³⁴ Under R.24(1)(b) P(HS)Regs 2015

³⁵ Under R.10(1)(c)(i,ii,iii) TCP(LP)(E)Regs 2012

³⁶ E.g. in REP4-034, page 16 last para.

6. Inconsistency in the Applicant's position on HSC

The Applicant's 2.2 asserts that its position on HSC ("it is too early to tell") was maintained "through-out the examination".

Commentary: This is completely untrue. On the contrary, the Applicant's position has progressively shifted as follows:

(a) The Application itself noted³⁷ the "Scoping Opinion" from HSE including the advice that "Further information on HSC should be sought from the relevant Hazardous Substances Authority". The Applicant dismissed this advice:

"This is a generic comment and not considered to be relevant to this project as no hazardous materials are expected".

I am aware of no consultation with the Hazardous Substances Authorities³⁸ (the District Councils), specifically on the question of HSC.

(b) In its Deadline 3A response to my Written Representation REP2-129, the Applicant cited a Parliamentary Written Answer³⁹ of July 2021 giving HSE views on the scope of the COMAH Regulations 2015, and asserting⁴⁰:

"Under the European Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP), and the associated enabling legislation in the UK, batteries are classified as articles, rather than substances and are therefore outside the scope of the COMAH and Hazardous Substances Consent"

In fact the Parliamentary Written Answer is incorrectly cited by the Applicant; in reality it makes no mention of HSC (commenting only on COMAH), so its presumed extension to HSC was always unwarranted.

(c) This position was maintained in the Applicant's REP4-034, claiming⁴¹ :
" ... that COMAH and HSC do not apply to batteries as they are not defined as hazardous substances under CLP."

(d) My own PHS after ISH3⁴² (the only Oral Hearing to address BESS Safety, inadequately⁴³) analysed this argument in detail, and dismissed it, inviting the Applicant to supply the legal authority for its position. It was unable to do so.

It should also be noted that I formally requested⁴⁴ an Issue-Specific Hearing on the questions of regulatory law, with active engagement of the COMAH CA (specifying both HSE and EA). No such Hearing was held.

³⁷ APP-048 page 16-24

³⁸ In EN010106, the relevant HSAs are East Cambridgeshire District Council, and West Suffolk Council.

³⁹ Reference UIN 29036, July 2021, available as Annex EF38 REP4-090

⁴⁰ See the Applicant's REP3A-035, pp 40–46, in particular page 44 for the cited text and quote from the Parliamentary answer UIN 29036

⁴¹ Applicant's REP4-034, pp 16–20, specifically page 18, 6th unnumbered paragraph

⁴² See my PHS after ISH3 REP4-089, also the detailed paper analysing the legal issues co-authored with Mr Pat Swords FICHEM PPSE, Annex EF40 REP4-092

⁴³ As protested at the Open Floor Hearing OFH2, documented in my Annex EF43 REP4-084 and my REP4-083

(e) Significantly, the Applicant did not attempt to rely further on the HSE position as stated in the Parliamentary Answer, beyond its submissions at Deadline 4. By D5, the Applicant's position had shifted⁴⁵ to:

“In summary it is said that at this stage, without detailed design of the BESS, it is not known with certainty whether Hazardous Substances Consent or authorisation under the COMAH Regulations is required. If, following detailed design, it is determined that consent is required then the Applicant will apply for it at the relevant time.”

Only from D5 onwards was the Applicant's position maintained consistently.

6.1 Engagement with HSE outside the Examination: For the avoidance of doubt, my clear conviction, openly declared at the outset⁴⁶, is that the HSE position, as outlined in the Parliamentary Answer UIN 29036, and in extensive correspondence with HSE, both directly, and via my Member of Parliament (The Rt Hon Lucy Frazer KC MP), is fundamentally wrong as a matter of law.

I believe that (i) it constitutes a major mis-reading and mis-statement of what the law requires, in the control of Major Accident Hazards, (ii) is demonstrably irrational against the law as enacted, and HSE's own Guidance Notes⁴⁷, and (iii) in asserting what amounts to an exemption for BESS from the COMAH Regulations, which is not found in the law as enacted, is *ultra vires*. HSE has not been able to cite any legal authority for its position.

It is irreconcilably divergent from the practice of the Health and Safety Executive for Northern Ireland (HSE(NI)) administering materially identical Regulations⁴⁸. Not more than one of two contradictory positions can be legally correct, and it is not credible for two United Kingdom jurisdictions to maintain opposite positions on regulatory law which is materially identical in both territories.

Having taken independent legal opinion, I remain confident that the HSE position in UIN 29036 is unsustainable, and would fail, if tested in the Courts.

Therefore, I do not believe that the HSE position can be relied upon in the Secretary of State's decision, without immediate exposure to legal challenge. Even the Applicant no longer relies upon it.

The current version⁴⁹ of Advice Note 11 Annex G also states, carefully avoiding mention of the COMAH Regs 2015:

Under Great Britain's health and safety legislation, HSE does not have a role in examining risk or hazard assessments unless the circumstances are covered by specific regulations (eg the on-shore chemicals sectors where threshold levels of dangerous substances are exceeded).

But the example of “the onshore chemicals sectors” is precisely one where the COMAH Regs 2015 *do* apply. This confirms that if COMAH does not apply, HSE does not examine risk assessments; if COMAH *does* apply, HSE does indeed do so.

⁴⁴ In my REP5-093, on title page, in the Summary para. 17, and in the main section para. 4.

⁴⁵ Applicant's REP5-056, page 43, ExQ 2.1.2, 5th un-numbered paragraph

⁴⁶ My PDA-016, 13 July 2022

⁴⁷ HSE Guidance Notes “L111” on the COMAH Regulations, available as Annex EF55 REP8-045b

⁴⁸ As noted in my REP4-089 paras. 26-27, my WR REP2-129 paras. 92 - 97 and Annexes EF29 to EF33, REP2-129q to REP2-129u

⁴⁹ HSE's REP7-112 1 March 2023 declares changes agreed to Advice Note 11, Annex G.

7. Stages at which HSC is required.

The Applicant's 2.2.2 denies that HSC is required at the consenting stage. Their 2.4 says that if later, in discharge of Requirements 6 and 7 of the DCO, "Sunnica determines that HSC is required ... it will make an application in the normal way".

Commentary. That HSC is not absolutely required at the consenting stage is in a narrow sense correct, but exceptional, being relegated to a footnote⁵⁰, and subject to Policy conditions which have not been satisfied⁵¹. NPS EN-1 clearly envisions⁵² that HSC would normally be granted by Direction⁵³, within the DCO process, with regulatory advice from HSE and public participation. The analysis in my REP11-028⁵⁴ does not need repetition. The central point is that deferred HSC must be seen in the context of the parallel safety assessment⁵⁵, by the COMAH CA, within the Examination, for projects subject to future COMAH obligations, as a need for HSC almost always implies. That safety assessment⁵⁶ covers Mitigation, a central purpose of the HSC regime, and would therefore have appraised the hazards within the Examination, even if HSC were formally deferred⁵⁷. There is no such assessment.

Hence "the normal way" for NSIP proposals, is by full consideration within the Examination process. For Sunnica to claim that "post-consent" application for HSC is "the normal way" is wrong, in the context of a NSIP application. It is exceptional, and the Policy is written in a way designed to ensure consideration of major accident hazards, *within* the Examination process, with input from the regulators, and public participation thereon. This has simply not happened.

Regarding "post-consent" application for HSC, to the local HSAs, I have at several places⁵⁸ pointed out that this would cause administrative chaos, involving *two* County Councils discharging the Battery Fire Safety Management Plan (BFSMP) under Requirement 7, and *two* District Councils acting as the Hazardous Substances Authorities for an application for HSC, yet all would be considering matters of strongly overlapping technical content. There is a real possibility that HSC is refused.

Whilst HSE has recused itself from consideration of the BFSMP⁵⁹, the COMAH CA (HSE plus the EA "acting jointly") must be consulted in an application for HSC⁶⁰. The decisions would therefore involve *four* Local Authorities, *two* regulatory agencies, and *two* local Fire and Rescue Services.

The administrative chaos and prolongation of uncertainty on affected members of the public would be unconscionable.

⁵⁰ Footnote 94 in National Policy Statement EN-1

⁵¹ As analysed in detail in my REP11-028

⁵² Section 4.12 "Hazardous Substances" NPS EN-1

⁵³ By the Secretary of State, under S.12(2B) Planning (Hazardous Substances) Act 1990

⁵⁴ Submitted as my response to a Rule 17 Letter from the ExA addressed to me personally.

⁵⁵ Under the "Safety" section 4.11.4 National Policy Statement EN-1

⁵⁶ Though under the "Safety" section 4.11 NPS EN-1, rather than Hazardous Substances, Section 4.12.

⁵⁷ By Footnote 94 and associated Policy conditions.

⁵⁸ Orally, at ISH1, documented in my REP2-082a, Summary para. 5, main text paras. 47-52.

⁵⁹ In HSE's REP7-112 letter

⁶⁰ By R.10(1)(a) P(HS)Regs 2015

8. Do the proposed BESS require HSC, and COMAH regulation, or not ?

The Applicant's 2.2.1 responds only that "it is not known at this stage" (without detailed design).

Commentary. This, the central question in the Secretary of State's Information Request (on HSC), has simply not been answered. The question clearly asked "whether or not" HSC is required, yet the Applicant persists with "we can't say".

Though framed in terms of the P(HS)Regs 2015, the question cannot be decoupled from the closely related question of whether the proposed BESS would be subject to the Control Of Major Accident Hazards Regulations 2015 (COMAH Regs 2015) i.e. whether or not they would comprise a COMAH "establishment".

This is because the Schedules of Hazardous or Dangerous Substances in those Regulations are closely aligned, both deriving from Seveso⁶¹. The P(HS)Regs 2015 (among others) "transposed" the Land-Use Planning requirements, whilst the COMAH Regs 2015 "transposed" the operational aspects. In almost all cases⁶² a requirement for HSC implies future COMAH regulation, and *vice versa*.

Whilst the current NPS EN-1 allows deferral of HSC (subject to conditions), there is no deferral available for the safety assessment applicable to future COMAH sites.

There is no provision in Policy or law for the Applicant's "indeterminate" response.

Either the proposal requires HSC and comprises a COMAH establishment, or it does not. Either the Policy⁶³ and legal requirements⁶⁴ for future COMAH sites apply, or they do not. Either a Risk Assessment is required as in Advice Note 11 Annex G, or it is not. The proper conduct of the Examination and Decision process demands that the question be resolved one way or the other. If the status of the proposal is not determined, the Application is simply premature and must fail.

There are compelling legal reasons why the Applicant's position should not be allowed to prevail. If it were, any application for almost any major industrial plant⁶⁵ would be able to subvert the law regarding major accident hazards, simply by withholding critical details and declaring "we cannot tell at this stage"⁶⁶. In effect this is what Sunnica is attempting, asking for a "blank cheque".

The Secretary of State cannot proceed on the assumption that the BESS are *not* a COMAH site, because if, in a subsequent application for HSC, it were determined that the BESS *are* a COMAH site, that would expose an unlawful process, being void of the safety assessments and consultations required *now*, both by Policy and law.

Only the Applicant, who seeks consent to build the project, is in a position to know fully what is proposed. It is surely the Applicant's responsibility to determine

⁶¹ The "Seveso III Directive" 2012/18/EU

⁶² Strictly speaking, COMAH establishments *always* require HSC; HSC obligations *almost* always imply future COMAH obligations.

⁶³ In section 4.11.4 NPS EN-1

⁶⁴ In R.26(2)(b,c,d) P(HS)Regs 2015

⁶⁵ For example, hazardous waste facilities would qualify as NSIPs under S.30 Planning Act 2008.

⁶⁶ See my D10 Comments REP10-064, paras. 34–36, and summary paras. 11–12

the question. At the construction stage, COMAH notification is unambiguously the responsibility of the operator. In case of doubt, Sunnica could have sought a formal determination from the COMAH CA, as to whether the BESS proposal did, or did not, comprise a COMAH establishment. They did not do so⁶⁷.

8.1 Need for detailed design, or otherwise

On technical grounds, the Applicant's contention that detailed design is required to determine the question is rejected as fundamentally wrong. For a proposal close to applicable quantity thresholds this might be so, but for a proposal of such unprecedented scale the conclusions are clear. HSC/COMAH obligations are determined solely by whether aggregate *quantities* present (including contingent presence in accidents) exceed specified thresholds, and nothing more.

Only *total quantities* are relevant. *Rates* of generation in accidents, dispersal in a variety of weather conditions, whether contained successfully or not, are all immaterial to the existence of the obligations. Moreover, for such a large project, accuracy may be unimportant. Whether a quantity threshold is exceeded by 5%, or 500-fold, is immaterial. HSC/COMAH obligations apply in both cases.

Whilst the BESS have remained under-specified throughout, a choice between two battery cell chemistries (the so-called "NMC" and "LFP" types of Li-ion cell dominant in the industry) has been declared. For both cell types, the behaviour in failure is amply documented in the technical literature and by expert testimony. Whilst actual test data are always to be preferred, the technical literature is sufficient to make estimates of the Hazardous/Dangerous Substances generated in failure, with "reasonable to foresee" estimates of likely quantities.

Indeed some such assessment would be required for failure modelling *even if* a stable design were available, because these would part of the *input* data required for a more elaborate model⁶⁸. Other than final specification of the cells to be used, detailed design cannot materially alter what is governed by fundamental chemistry.

This was the entire point and purpose of the lists of Hazardous Substances and threshold estimates already supplied⁶⁹. In effect we have done what is properly the responsibility of the Applicant.

Where a detailed design *is* required, is for what the Applicant has called⁷⁰ a "full consequence model" of *consequences* of a major accident. This would indeed be required to address rationally the question of "appropriate safety distances" required to appraise the the "Article 13(2) matters" discussed under Item 5 above.

Deciding if HSC/COMAH obligations apply, and a "full consequence model" are two different and distinct engineering tasks. The Applicant confuses the two.

⁶⁷ Though the "Safety" Section 4.11.4 requires "early contact with the Competent Authority".

⁶⁸ What the Applicant calls a "full consequence model"

⁶⁹ Starting with my Annex EF16 REP2-129e and Written Representation REP2-129, moving to the "provisional assignments" required by Part 4 Note 6 P(HS)Regs 2015, with further material on Inhalable Nickel Oxides and the demonstration of a Major Accident Hazard as defined in law, and other matters, in Comments at D6, D7 and D8 REP6-084, REP7-09 and REP8-045.

⁷⁰ In their REP4-032, p 22, item 5.1.20(c); also REP5-056 p 49, and elsewhere.

8.2 Hazardous / Dangerous Substances generated during loss of control

Regarding the Hazardous/Dangerous substances “generated during loss of control of the processes”, there is no doubt whatever that substances in all of the hazard groups in Part 1 (Health, Physical and Environmental) are “reasonable to foresee”, as are Named Hazardous Substances in Part 2 (Hydrogen, and Nickel Compounds in Inhalable Powder Form). The technical literature is clear, and could not be credibly disputed by any properly informed engineer.

This on its own implies that all functional substances “S” in the battery cells are “Substances Used in Processes” under Part 3 P(HS)Regs 2015.

The only open question concerned quantities, which was the subject of my detailed paper with Professor Sir David Melville CBE, and WR⁷¹, for both of the cell types (NMC, or LFP) declared by Sunnica. The summary Table⁷² summarises the conclusions, and the WR lists the Hazardous Substances identified⁷³, and the degree by which the Controlled Quantities are exceeded⁷⁴.

The question of HSC/COMAH obligations is determined by the hazardous substance (or aggregation of Health, Physical and Environmental hazards in turn) that most obviously exceeds a prescribed threshold. This is not to negate the hazard presented by other substances; the question is the regulatory one: has any one threshold been exceeded, or not? This is relatively straightforward.

Only *one* threshold need be exceeded to determine a COMAH site. Contrariwise, for a site *not* to involve HSC/COMAH obligations, *all* reasonably foreseeable hazardous substances would need to be shown to be “below threshold”.

NMC cells: A proper specification may alter estimates somewhat (NMC cells are themselves a class, with variable quantities of Nickel, Cobalt and Manganese) but the dominant regulatory concern is the generation of “Nickel Compounds in Inhalable Powder Form”, a stringently controlled Named Hazardous Substance⁷⁵ in Part 2. The Controlled (or Qualifying) Quantity is particularly low, just 1 tonne.

The complete destruction of a single BESS container of 5 MWh is used as a reference case accident by HSE(NI)⁷⁶. From actual BESS specifications⁷⁷, a 5 MWh NMC BESS contains between 3.63 and 4.95 tonnes of Nickel Oxide in its cathode materials⁷⁸. These are known to disintegrate into “black smokes” in thermal runaway accidents⁷⁹. Only a low proportion (20.2 – 27.5%) of the total content need be converted to inhalable powder for the CQ to be exceeded, and the literature⁸⁰ suggests that over 50% conversion is “reasonable to foresee”.

⁷¹ Paper with Sir David Melville in Annex EF16 REP2-129e, and WR REP2-129

⁷² Annex EF16 REP2-129e p 51 Table 13; also REP2-129 para. 70

⁷³ REP2-129 Summary para. 3, main text para. 49, 52, 57, 58

⁷⁴ REP2-129, Summary para. 4: over 800-fold for NMC cells, and over 100-fold for LFP cells.

⁷⁵ Entry 11 in Part 2 to the Schedules of both Regulations

⁷⁶ Annex EF28 REP2-129p

⁷⁷ Annexes EF16 REP2-129e, EF22 REP2-129k, EF50 REP7-049b and EF52 REP7-049d

⁷⁸ For the so-called “1:1:1” and the “Nickel-rich” “8:1:1” compositions respectively.

⁷⁹ As shown in images in Annex EF16 REP2-129e, p 42, Figures 5(a) and 5(b), and associated text

⁸⁰ Annex EF24 REP-129m

In the case of Sunnica, exceptionally large BESS containers have been proposed⁸¹, approaching 6 times the volume of a standard ISO shipping container, which could accommodate up to 19 MWh of energy storage, on a volume basis. The mass of Nickel Oxide could be as much as 18.8 tonnes, of which only 5.3% need be converted to “Inhalable Powder Form” in an accident for the CQ to be exceeded.

Hence it is more than “reasonable to foresee” the Controlled Quantities for HSC being exceeded in a single-container NMC BESS accident, using HSE(NI)’s reference case and in spite of the very loose specification so far provided by Sunnica. Once one recognises (a) the phenomenology of thermal runaway, (b) the disintegration of the cathodes into smokes, and (c) evidence of 50% electrode material conversion, only simple arithmetic is required to reach this conclusion.

Furthermore, though multi-container BESS accidents are matters of record, no consideration of cabin-to-cabin escalation is required, in this case, to reach the conclusion. Whilst other Hazardous Substances are of course involved, it is unnecessary to consider them further to conclude that HSC/COMAH obligations are triggered. Where further consideration *is* required, is in “full consequence models” of such BESS accidents.

The corresponding Qualifying Quantity for COMAH (also 1 tonne) is for “upper tier” obligations, reflecting the seriousness of the hazard attributed to “Inhalable Nickel Compounds”. This is likewise “reasonable to foresee” being exceeded in a single-container BESS accident, even without cabin-to-cabin escalation.

Whilst NMC cells remain an option that Sunnica retains in EN010106 (it would be consistent with the Scheme Description to deploy them), it is not strictly necessary to consider LFP cells. However even if a Requirement *had* been agreed restricting the cell type to the LFP chemistry, other considerations arise as follows.

LFP cells: The dominant regulatory concern⁸² with LFP cells is the generation of the Acute Toxic Hydrogen Fluoride (HF) gas, alone or “aggregated” with other Health Hazards⁸³, particularly the Acute Toxic Carbon Monoxide (CO) gas. LFP cells tend to generate higher quantities of HF in failure than NMC cells do, and literature sources⁸⁴ now routinely cited by HSE(NI) provide total emissions in milligrams (mg) per unit energy storage capacity in watt-hours (Wh). An independent expert report⁸⁵ for HSE(NI) shows that the maximum HF generation reported⁸⁶ comprises only 36% of a full stoichiometric conversion of Fluorine-containing substances into HF. Hence even higher HF generation, under full-scale accident conditions, cannot be excluded.

This leads to the Part 3 threshold for Acute Toxic gases being breached, by HF alone, with an inventory of LFP cells corresponding to about 25 MWh of storage⁸⁷, or potentially less (if actual HF generation is higher than in the published sources).

⁸¹ Applicant’s revised OBFSMP REP2-032, Table 3, p6, “BESS container”

⁸² i.e. the hazardous substance or category most obviously exceeding the thresholds

⁸³ According to the so-called Aggregation Rule in Part 4 Note 5 P(HS)Regs 2015

⁸⁴ Annex EF15 REP2-129d

⁸⁵ Annex EF28 REP2-129p

⁸⁶ In the peer-reviewed paper in Annex EF15 REP2-129d

⁸⁷ See Annex EF16 REP2-129e p 51 Table 13; also REP2-129 para. 70

However this is not a sufficient application of the Regulations, which requires⁸⁸ all Health hazards, all Physical hazards, all Environmental hazards to be considered in aggregate, for each hazard group in turn.

For Health Hazards, the HF generated must be “aggregated” with other Acute Toxic gases, principally Hydrogen Cyanide (HCN), a known hazard in BESS accidents⁸⁹, and Carbon Monoxide (CO), a routine component of BESS “fires”. The principal uncertainty is in the quantity of CO generated, because this will be strongly affected by supply of external air causing combustion to Carbon Dioxide (CO₂) which is non-toxic. Nevertheless estimates are possible from actual measurements in Li-ion battery fires⁹⁰, providing a “free air” basis. This is not however the worst case, because if air supply is restricted⁹¹, then *less* oxidation of CO to CO₂ may occur, leading to *larger* quantities of CO.

A range was therefore provided⁹² between 16.7 MWh and 22.1 MWh energy storage capacity from the Aggregation Rule for Acute Toxic gases. This is a somewhat more stringent threshold than for HF alone, and likewise could be reduced if HF generation is greater than the published sources.

Depending on container size and capacity in MWh (which Sunnica has resolutely refused to specify), more than one BESS container might need to be involved for *actual* generation to exceed these thresholds. However multi-container BESS accidents are matters of record, notably the 2021 accident in Beijing⁹³ involving fire in one container and an explosion in a spatially remote container, and which was a LFP system. Without control measures rendering cabin-to-cabin escalation “reasonable to *exclude*”⁹⁴, they remain “reasonable to *foresee*”, and thus must be considered. No such control measures, with proven efficacy, have been shown in the Application or Examination⁹⁵.

For the largest container footprint⁹⁶ given by Sunnica, capable of accommodating up to 19 MWh on a volume basis, even a single-container accident could trigger HSC/COMAH obligations.

With an aggregate capacity of 2400 MWh now declared, it is obvious that the total chemical content is well in excess of the Controlled Quantity for HSC, whether HF alone is considered, or in aggregation with other Acute Toxics.

⁸⁸ By the so-called Aggregation Rule of Part 4 Note 5 P(HS)Regs 2015

⁸⁹ As at McMicken, Arizona, in 2019, Annexes EF11 EF12, REP2-082I and REP2-129a

⁹⁰ Annex EF18 REP2-129g

⁹¹ For example by dry powder, “clean-agent” aerosols or Aerosol-forming composite (AFC) fire suppression systems, which are popular (though known to be ineffective) in Li-ion BESS. The attempt at “smothering” will only tend to increase the CO / CO₂ ratio in a “fire”.

⁹² See Table in para. 70 of my WR REP-129

⁹³ Annex EF13 REP2-129b

⁹⁴ In accordance with EU precedent in Annex EF53 REP7-094e

⁹⁵ The cabin-to-cabin escalation issue was raised in my REP3A-046, Summary para. 6, main text paras. 24–36, in my REP4-089, para. 3(h), p. 11, and further in my REP7-094 Summary para. 1, main text paras. 5–11. The latter includes formal objection to misrepresentation by the Applicant of prior submissions.

⁹⁶ Applicant’s revised OBFSMP REP2-032, Table 3, p6, “BESS container”

8.3 Provisional Assignment of non-CLP substances, used in normal operation, under Part 4 Note 6 (P(HS)Regs 2015) or Part 3 Note 5 (COMAH Regs 2015)

The above “loss of control” criteria (NMC cells or LFP cells) involve Health hazards alone (potent carcinogens, in the case of Inhalable Nickel Oxides, acute toxic gases in the case HF and CO). However both types of BESS are known to be involved in so-called BESS “fires” or Vapour Cloud Explosions (VCE), which are clearly a Major Accident Hazard.

Whilst Physical Hazards (flammable gases and aerosols) are explicitly considered in my WR⁹⁷ under “loss of control”, the processes leading to VCE are more complex to analyse because of the delayed ignition of the mixture of Flammable aerosols, hydrocarbon gases, Carbon Monoxide and Hydrogen generated in thermal runaway.

As developed in later submissions⁹⁸, a simpler way to address the Major Accident Hazard presented by the worldwide record of BESS “fires” or explosions is provided in Part 4 Note 6 (the identical provisions for the COMAH Regs 2015 are in Part 3 Note 5). This requires substances “[not covered by the CLP Regulation](#)” which are “[likely to possess, under the conditions found at the establishment, equivalent properties in terms of major accident potential](#)” to be “[provisionally assigned to the most analogous category or named dangerous substance](#)” in Parts 1 or 2.

It is clear that the “loss of control” provisions in Part 3 P(HS)Reg 2015 regard *all* substances “S” “[used in that process](#)” as Hazardous Substances under Part 3.

Equivalently, the functional chemicals “S” in the BESS cells in the combinations found, especially in high States of Charge, clearly present “[under the conditions found at the establishment](#)” a major accident hazard. Hence under Part 4 Note 6 they “[must be provisionally assigned](#)” to an appropriate hazard category.

That the worldwide record of Li-ion BESS accidents establishes a “major accident hazard” as defined in law, and consistent with HSE’s own Guidance Notes, was analysed in detail, with notice given⁹⁹ to the ExA.

On fundamental chemical grounds, what occurs in Li-ion “thermal runaway” accidents is a self-reactive chemical process. It is *not* a “fire”, because no oxygen is required (oxygen may be generated internally from collapse of the cathode structures) and though very hot, there may well be no flame, until ignition of a combustible vapour cloud in a VCE. Hence a “provisional assignment”¹⁰⁰ of the BESS cells as a Self-Reactive Mixture (in category P6a or P6b of Part 1) is scientifically rational, on the basis of the fundamental chemistry of what occurs in thermal runaway.

Alternatively, it is empirically known that Li-ion cells in high States of Charge may fail explosively. On the empirical evidence, a “provisional assignment” as Explosive Articles (in category P1a or P1b) is equivalently rational from a practical engineering

⁹⁷ REP2-129

⁹⁸ In REP6-060 and REP8-045

⁹⁹ REP8-045, paras. 20 – 38, with formal Notice given at para. 38 and Summary para. 6.

¹⁰⁰ Under Part 4 Note 5 P(HS)Regs 2015

perspective. Video evidence of Li-ion battery failures demonstrates behaviour consistent with a Division 1.3 Explosive Article (category P1a). Even Division 1.4 behaviour falls into category P1b.

The choice between Self-Reactives and Explosive Articles is immaterial from a regulatory point of view because the CQs (and QCs, for “lower-tier” COMAH) are the same for P6a Self-Reactives and P1a Explosive Articles (10 tonnes) and for P6b Self-Reactives and P1b Explosive Articles (50 tonnes).

The estimated tonnage of functional chemicals (15,000 tonnes) in the Sunnica proposal is clearly so far in excess of the CQ for either category that there can be no doubt whatsoever that the Sunnica BESS comprise a COMAH site and require HSC. It is not even necessary to discriminate P6a from P6b Self-Reactives, or P1a from P1b Explosive Articles, to reach this conclusion. 15,000 tonnes exceeds 50 tonnes just as it exceeds 10 tonnes.

It should be noted that a “provisional assignment” under Part 4 Note 6 is to a Hazard category in Part 1. Then the entire inventory of Hazardous Substances must be taken into account, and control measures are irrelevant. HSC/COMAH obligations arise from mere presence on the site, irrespective of detailed design.

There is no requirement at all for a finalised design for the Part 4 Note 6 assignment to be made, and in the case of Sunnica, no need to discriminate between P6a and P6b, or between P1a and P1b, because HSC/COMAH obligations are triggered in all cases.

In case of dispute, the provisional assignment as Explosive Articles has the advantage that confirmatory testing is available in the UN Manual of Tests and Criteria¹⁰¹. This offers a means to confirm, or reject, assignment as an Explosive Article, independently of disputes on paper, or even of regulatory or judicial decisions. Performing the tests settles the question, with full scientific objectivity.

Unless actual testing confirms that BESS cells in a high State of Charge can be rejected¹⁰² from the class of Explosives (even in the “mild” Division 1.4) the conclusion is once again very clear: Li-ion BESS involving more than 50 tonnes of functional chemicals across the establishment are COMAH sites and require HSC, irrespective of detailed design and control measures.

¹⁰¹ Annex EF46 REP6-061

¹⁰² The test procedures have legal force in the UK *via* their inclusion in the CLP Regulation (Annex I R. 2.1.4.1 of the CLP Regulation), and decision flow charts are in Figures 2.1.2 and 2.1.3 in Annex I of the CLP Regulation.

8.4 Summary

Without any detailed design, it is straightforward to show the following from the technical literature, and the application only of simple arithmetic:

A. Under the “Loss of control” provisions in Part 3 P(HS)Regs 2015

Li-ion BESS of the NMC type: It is reasonable to foresee the CQ, (and QQ for “upper-tier” COMAH, 1 tonne) for “Nickel Compounds in Inhalable Powder Form” (a Named Hazardous Substance in Part 2) being exceeded by an accident in a single container of 5 MWh storage capacity, containing between 3.63 and 4.5 tonnes of Nickel Oxide. The Sunnica BESS (2400 MWh) plainly exceed this. The largest single container specified by Sunnica could accommodate as much as 19 MWh, in which exceeding the CQ would be even more “reasonable to foresee”.

Li-ion BESS of the LFP type: The CQ (and QQ for “lower-tier” COMAH) for “Acute Toxic Gases” (HF plus HCN plus CO) is foreseeably exceeded by installations between 16.7 and 22.1 MWh capacity, and on the basis of HF alone at 25 MWh capacity. The Sunnica BESS plainly exceed this capacity. One of the large containers mooted could exceed the thresholds on its own. No control measures have been shown to render multi-container accidents “reasonable to *exclude*”.

B. Under the “normal operation” hazard categories in Part 1, using the Part 4 Note 6 “provisional assignments”:

P6a Self-Reactives or P1a Explosive Articles (Division 1.3): The CQ (and QQ for “lower-tier” COMAH, 10 tonnes) is plainly exceeded by the estimated 15,000 tonnes of functional chemicals in a BESS of 2400 MWh capacity. “Upper-tier” COMAH obligations are imposed at 50 tonnes, so Sunnica becomes an “upper-tier” COMAH site. As an assignment of a hazard category in Part 1, design is irrelevant, and the full inventory of chemicals over the establishment must be considered.

P6b Self-Reactives or P1b Explosive Articles (Division 1.4): The CQ (and QQ for “lower-tier” COMAH, 50 tonnes) is plainly exceeded by the 15,000 tonnes inventory in the Sunnica BESS. “Upper-tier” COMAH obligations are imposed at 200 tonnes, so Sunnica is an “upper-tier” COMAH site, irrespective of design.

A variety of criteria in the Regulations have been considered but all lead inexorably to the conclusions that under all credible possibilities the Sunnica BESS comprise a COMAH establishment and require HSC.

Breach of a *single* threshold is all that has to be shown, as in four cases above.

To *escape* HSC/COMAH obligations requires that *all* reasonably foreseeable hazardous substances are “below threshold” in *all* reasonably foreseeable “loss of control” situations, and that *all* chemical components (including “provisional assignments” under Part 4 Note 6) are similarly “below threshold”. Given the sheer scale of the Sunnica proposal, it is most improbable that this could be shown.

The conclusion is very clear: the Sunnica BESS require HSC and are subject to “upper-tier” COMAH obligations, on multiple grounds.

Appendix A

Index to principal submissions to the Examination of EN010106 made by:

**Dr Edmund Fordham
Interested Party unique ID: 20030698**

Link to the Sunnica EN010106 Examination Library

[https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010106/EN010106-002090-Sunnica Energy Farm Examination Library.pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010106/EN010106-002090-Sunnica%20Energy%20Farm%20Examination%20Library.pdf)

Relevant Representation and miscellaneous procedural submissions:

- RR-0648 (12 March 2022) – summary of objections
- PDA-014 (13 July 2022) – submission regarding timetable
- PDA-015 (13 July 2023) – suggestions for site inspections
- PDA-016 (13 July 2022) – Hazardous Substances Consent and position of HSE
- PDA-017 (13 July 2022) – BESS as Associated Development

- PDC-011 (14 September 2022) – request to speak at Preliminary Meeting and for dedicated ISH on BESS Safety.

A. Principal submissions to Examination [Dr E J Fordham IP 20030698]

- REP2-082a PHS after ISH1 on the dDCO
- REP2-129 Written Representation on Hazardous Substances Consent for the BESS components
- REP3A-046 Comments on the Applicant’s Responses to Questions from the ExA, on BESS safety issues
- REP4-086 PHS on ISH2: Ecology & Biodiversity
- REP4-089 PHS on ISH3: BESS safety and consenting requirements
- REP4-084 Annex EF43 transcript of timed and recorded remarks at OFH2
- REP4-083 PHS on OFH2: Need for involvement of Regulator and Scheme benefits
- REP5-093 Comments at Deadline 5
- REP6-060 Comments at Deadline 6
- REP6-084 Letter to Examining Authority requesting inclusion of Annex EF48, with reasons
- REP7-094 Comments at Deadline 7
- REP8-045 Comments at Deadline 8
- (no submissions at Deadline 9)
- REP10-064 Comments at Deadline 10
- REP11-028 Response to request for further information from ExA

B. Original technical papers in the public domain are found at

- REP2-082c Annex EF2 Safety of grid-scale Li-ion BESS
(with Prof Wade Allison and Prof Sir David Melville CBE)
Also at DOI: 10.13140/RG.2.2.11566.79687
- REP2-129e Annex EF16 Hazardous Substances potentially generated in loss of
control accidents in Li-ion BESS
(with Prof Sir David Melville CBE).
Also at DOI 10.13140/RG.2.2.35893.76005
(version 3.9 here corrects material typographic error)
- REP4-092 Annex EF40 “Application of the COMAH and Hazardous Substances
Consents Regulations to Battery Energy Storage
Systems (BESS): Does classification as “articles” exempt
a technology ?”
(with Mr Pat Swords CEng CEnv PPSE FICHEM E)
Also at DOI 10.13140/RG.2.2.22471.98724

C. All Annexes in numerical order as added, called EF1 – EF57:

- REP2-082b Annex EF1 Personal details
- REP2-082c Annex EF2 Safety of grid-scale Li-ion BESS (with Prof Wade Allison
and Prof Sir David Melville CBE)
- REP2-082d Annex EF3 Hazardous Substances (Planning) Common Framework
- REP2-082e Annex EF4 The Seveso III Directive 2012/18/EU
- REP2-082f Annex EF5 Planning (Hazardous Substances) Regulations 2015
- REP2-082g Annex EF6 Explanatory Memorandum to the P(HS)Regs 2015
- REP2-082h Annex EF7 The Planning (Hazardous Substances) Act 1990
- REP2-082i Annex EF8 Overarching National Policy Statement for Energy NPS
EN-1
- REP2-082j Annex EF9 Speech of Dame Maria Miller MP, House of Commons
- REP2-082k Annex EF10 Energy Institute, Battery Storage Guidance Note 1
- REP2-082l Annex EF11 D. Hill (2020) “McMicken BESS event” Arizona Public
Service
- REP2-129a Annex EF12 Underwriters Labs report into McMicken BESS event
- REP2-129b Annex EF13 (5 items) April 2021 fire and explosion in Beijing
- REP2-129c Annex EF14 (3 items) Reports from Merseyside Fire and Rescue into
Liverpool fire and explosion of September 2020
- REP2-129d Annex EF15 Larsson et al. (2017), *Sci. Reps.* **7**, 10018
DOI: 10.1038/s41598-017-09784-z

- REP2-129e Annex EF16 Hazardous Substances potentially generated in loss of control accidents in Li-ion BESS (with Prof Sir David Melville CBE)
- REP2-129f Annex EF17 Golubkov et al. (2014). *RSC Adv.*
DOI: 10.1039/c3ra4578f
- REP2-129g Annex EF18 *FM Global*: “Flammability characterization of Li-ion batteries in bulk storage”
- REP2-129h Annex EF19 Bergström et al. (2015) “Vented gases and aerosol of automotive Li-ion LFP and NMC batteries in humidified Nitrogen under thermal load”
- REP2-129i Annex EF20 (2 items) Victorian Big Battery Fire, July 2021. Report of technical findings and compendium of news items
- REP2-129j Annex EF21 (2 items) Commissioner’s Letter, Arizona Public Service, August 2019. Also Fire Dept report into earlier 2012 BESS fire.
- REP2-129k Annex EF22 Technical memo, Golder Associates, re composition of BESS at Kells, Northern Ireland
- REP2-129l Annex EF23 Ouyang *et al.* (2018), *J. Thermal Analysis and Calorimetry*, DOI: 10.1007/s10973-018-7891-6
- REP2-129m Annex EF24 Essl *et al.* (2020), *Batteries*, **6**, 30 DOI: 10.3390/batteries6020030
- (no entry) Annex EF25 Chen *et al.* (2020), *J. Hazardous Materials*, **400**, 123169
DOI: 10.1016/j.jhazmat.2020.123169
Citation only of copyright article
- REP2-129n Annex EF26 Held *et al.* (2022) *Renewable and Sustainable Energy Reviews*, **165**, 112474
DOI: 10.1016/j.rser.2022.112474
- REP2-129o Annex EF27 Wang *et al.* (2019) *Energy Science and Engineering*, **7**, 411-419
DOI: 10.1002/ese3.283
- REP2-129p Annex EF28 Hazard Assessment of BESS, Technical Report by Atkins (Consulting Engineers) for Health and Safety Executive for Northern Ireland
- REP2-129q Annex EF29 Letter 13/05/2022 from HSE(NI) to Ards and North Down Borough Council
- REP2-129r Annex EF30 Letter 22/09/2022 from HSE(NI) to Derry City and Strabane District Council
- REP2-129s Annex EF31 Letter 10/09/2021 from HSE(NI) to Armagh City, Banbridge & Craigavon Local Planning Office

REP2-129t	Annex EF32	Letter 18/07/2022 from HSE(NI) to Derry City and Strabane District Council
REP2-129u	Annex EF33	Letter 20/05/2021 from HSE(NI) to to Armagh City, Banbridge & Craigavon Local Planning Office
REP3A-047	Annex EF34	<i>FM Global</i> : “Development of sprinkler protection guidance for Lithium-ion based energy storage systems”
REP3A-048	Annex EF35	P. Andersson <i>et alia</i> , “Investigation of fire emissions from Li-ion batteries”, <i>SP Technical Research Institute of Sweden</i> , 2013.
REP4-087	Annex EF36	Barron-Gafford <i>et al.</i> (2016). The photovoltaic heat island effect <i>Scientific Reports</i> 6 , 35070, DOI:10.1038/srep35070
REP4-088	Annex EF37	Armstrong <i>et al.</i> (2016). Solar park microclimate ... <i>Environmental Research Letters</i> 11 (7) 074016 DOI: 10.1088/1748-9326/11/7/074016
REP4-090	Annex EF38	Parliamentary Written Answer (Mims Davies MP for DWP, to Steve Baker MP) July 2021 UIN 29036
REP4-091	Annex EF39	ABO Wind NI Ltd case HUM11648 [2021] NIQB 96
REP4-092	Annex EF40	“Application of the COMAH and Hazardous Substances Consents Regulations to Battery Energy Storage Systems (BESS): Does classification as “articles” exempt a technology ?” (with Mr Pat Swords CEng CEnv PPSE FIChemE)
REP4-093	Annex EF41	Letter 17 December 2015 from Occupational Safety and Health Administration (OSHA) of the USA regarding classification of Li-ion batteries.
REP4-094	Annex EF42	Swords (2009) “Implementing EU industrial safety legislation in Central and Eastern Europe” <i>Symposium Series No. 155, Hazards XXI</i> , Institution of Chemical Engineers, pp 256 – 262.
REP4-084	Annex EF43	transcript of timed and recorded remarks at OFH2
REP4-085	Annex EF44	transcript of final interview with the late Professor Sir David MacKay FRS, April 2016
REP5-094	Annex EF45	The Control Of Major Accident Hazards Regulations 2015
REP6-061	Annex EF46	United Nations Manual of Tests and Criteria, 7th edition
REP6-083	Annex EF47	Letter from DLUHC regarding operation of Part 3 of the P(HS)Regs 2015

- REP6-085 Annex EF48 Letter from HSE(NI) to Armagh City, Banbridge and Craigavon Borough Council regarding application of COMAH and HSC to BESS
- REP7-094a Annex EF49 Buston, J E H *et al.*, (2023) *Energy Advances* **2**, 170
- REP7-094b Annex EF50 Revised Golder Memorandum, 19 Dec 2022
- REP7-094c Annex EF51 Jensen Hughes memorandum, 3 March 2023
- REP7-094d Annex EF52 Advice letter from HSE(NI), 12 January 2023
- REP7-094e Annex EF53 KAS-43 Guidance Notes from German “Commission of Plant Safety” with English translation of Section 3.
- REP8-045a Annex EF54 HSE advice to Applicant at EIA and S.42 stages
- REP8-045b Annex EF55 Guidance Notes “L111” on the COMAH Regs, Health and Safety Executive
- REP8-045c Annex EF56 EC Memorandum to stakeholders transposing the Seveso III Directive
- REP8-045d Annex EF57 exchange of letters with Applicant, November 2020

Appendix B

Response from HSE to enquiry under the Freedom of Information Act 2000

Dated 31 May 2023

HSE Reference 202305168

Via Email: [REDACTED]@yahoo.co.uk>

31st May 2023

Dear [REDACTED]

Freedom of Information Request Reference 202305168

Thank you for your request for information about:

Environmental Impact Assessment Section 42 and 56 Stages

Your request was received on **11th May 2023** and I am dealing with it under the terms of the Freedom of Information Act 2000 (the Act).

I can confirm that the Health and Safety Executive holds the following information for the Section 42 consultation, **HSE does not hold any advice given for Section 56**

[Certain personal data relating to third parties has been redacted (edited out) as it is exempt from disclosure under section 40(2) (personal information) of the FOI Act.]

If you have any queries about this letter, please contact me. Please remember to quote the reference number above in any future communications.

If you are unhappy with the decisions made by HSE you may ask for an internal review within two calendar months of the date of this letter by writing to me.

If you are not content with the outcome of the internal review you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at:

The Information Commissioner's Office
Wycliffe House
Water Lane
Wilmslow
Cheshire
SK9 5AF
Tel: [REDACTED]
Email: casework@ico.org.uk
Website: <https://ico.org.uk>

Yours sincerely

Janet McParland
Central Disclosure Officer

CEMHD Policy - Land Use Planning,
NSIP Consultations,
Building 1.2,
Redgrave Court,
Merton Road,
Bootle, Merseyside
L20 7HS.

Sunnica Energy Farm
By email only

Dear [REDACTED],

15 October 2020

**Section 42 Planning Act 2008: Statutory Consultation
- Sunnica Energy Farm**

Thank you for your letter of the 16 September 2020 consulting on the proposed Sunnica Energy Farm, under Section 42 of The Planning Act 2008.

HSE's land use planning advice

Will the proposed development fall within any of HSE's consultation distances?

According to HSE's records there is one major accident hazard site and six major accident hazard pipelines within the proposed DCO application boundary of the Sunnica Energy Farm for this nationally significant infrastructure project.

This is based on the current configuration for the red line area as illustrated in, for example, the SCHEME BOUNDARY (Drawing number: 60589004_COMMS_001), of the Sunnica Energy Farm Consultation Booklet 22 September - 2 December 2020.

The major accident hazard site is:

HSE reference H3161 operated by HW Coates

The major accident hazard pipelines are:

HSE Reference No.	TRANSCO Index No.	Pipeline Operator	Pipeline/Location Name
8219	2486	Cadent Gas Ltd	Great Wilbraham / Burwell
7452	1710	National Grid Gas PLC	3 Feeder Roudham Heath / Great Wilbraham
7444	1703	Cadent Gas Ltd	Burwell / Ely
7399	1658	Cadent Gas Ltd	Mildenhall Reinforcement
7398	1657	Cadent Gas Ltd	Burwell / Wess house
7397	1656	Cadent Gas Ltd	Ness House / Freckenham

Both FIGURE 3-1 SUNNICA EAST SITE A AND B PARAMETER PLAN (drawing number 60589004_PEIR_SD_001) and FIGURE 3-2 SUNNICA WEST A AND B PARAMETER PLAN (drawing number 60589004_PEIR_SD_002) illustrate where populations may be present e.g. offices and warehouses. None of these are within any of the above zones; therefore, providing there are no major changes to the locations of populations HSE would not advise against this proposal.

Hazardous Substance Consent

The presence of hazardous substances on, over or under land at or above set threshold quantities (Controlled Quantities) will probably require Hazardous Substances Consent (HSC) under the Planning (Hazardous Substances) Act 1990 as amended. The substances, alone or when aggregated with others for which HSC is required, and the associated Controlled Quantities, are set out in The Planning (Hazardous Substances) Regulations 2015 as amended.

HSC would be required to store or use any of the Named Hazardous Substances or Categories of Substances at or above the controlled quantities set out in Schedule 1 of these Regulations.

Further information on HSC should be sought from the relevant Hazardous Substances Authority.

Explosives sites

HSE has no comment to make as there are no licensed explosives sites in the vicinity.

Electrical Safety

No comment from a planning perspective.

Please note that any further electronic communication on this project can be sent directly to the HSE designated e-mail account for NSIP applications the details of which can be found at the top of this letter or hard copy correspondence should be sent to:

[REDACTED]
[REDACTED]
1.2 Redgrave Court
Merton Road, Bootle
Merseyside, L20 7HS

Yours sincerely,

[REDACTED]
[REDACTED]
CEMHD4 Policy